

REMARKS

This is in response to the Office Action dated January 24, 2005. Claims 1-6, 8-15 and 17-18 are pending.

It is noted that an IDS has been filed herewith.

Claim 1 stands rejected under 35 U.S.C. Section 103(a) as being allegedly unpatentable over Medwick in view of both Krisko and Veerasamy. This 3-way Section 103(a) rejection is respectfully traversed for at least the following reasons.

Claim 1 as amended requires "providing a coating on a glass substrate, the coating including at least one layer comprising Ag, and an uppermost layer of the coating comprises silicon nitride; ion beam depositing, using gas comprising a hydrocarbon, a protective layer comprising diamond-like carbon (DLC) on the glass substrate over the coating so as to directly contact the coating so that the protective layer comprising DLC directly contacts the uppermost layer of the coating that comprises silicon nitride; heat treating the glass substrate with the coating and protective layer thereon so that the protective layer comprising diamond-like carbon (DLC) at least partially burns off during the heat treating." It has surprisingly been found that the use of ion beam deposition for the DLC so that the DLC directly contacts silicon nitride, with gas comprising a hydrocarbon such as C₂H₂ in the ion source, is highly advantageous in that it results in much less damage, if any, to the underlying coating. In particular, the use of an ion beam in combination with the use of a layer comprising silicon nitride as an uppermost layer of the coating permits less damage to be done to the coating. This permits the DLC to be

applied directly to the coating with no barrier or other layer provided therebetween, thereby enabling processing steps to be saved compared to the cited art. The cited art fails to disclose or suggest this aspect of claim 1.

Medwick relates primarily to the use of a polymer protective coating that is removed by washing (e.g., paragraph [0031]). However, Medwick also mentions a carbon protective coating that may be removed by combustion (e.g., paragraph [0055]). However, Medwick's carbon coating is applied over a coating whose upper layer is an oxide (*not* comprising silicon nitride as called for in claim 1) (paragraph [0056]). Since the uppermost layer of Medwick's coating is an oxide, Medwick uses a "blocking layer 18" to prevent the carbon from pulling oxygen out of the coating (paragraph [0056]).

Thus, it can be seen that Medwick teaches directly away from applying DLC directly onto a coating whose uppermost layer comprises silicon nitride as called for in claim 1. As explained above, this significantly reduces damage which may be caused during formation of the DLC inclusive layer. In fact, Medwick teaches the opposite of this since Medwick teaches that (a) the uppermost layer of the coating 14 is an oxide, and (b) a barrier layer is provided between the coating and the carbon. This is, of course, undesirable in that extra processing and layer(s) are needed, thereby significantly increasing the cost of manufacture and decreasing yields.

In contrast, by using ion beam deposition with a gas comprising hydrocarbon in combination with a coating whose uppermost layer comprises silicon nitride, the instant inventors have found that much less damage is done to the underlying coating when the

DLC is deposited so as to contact the silicon nitride. Thus, the DLC can be deposited in a more efficient manner directly onto the coating with no need for a blocking layer that is needed in Medwick.

The Office Action cites Veerasamy for the use of DLC. However, citation to Veerasamy cannot overcome the fundamental flaws of Medwick discussed above. There is nothing in Veerasamy which would have caused one of ordinary skill in the art to modify Medwick in a manner which would overcome the aforesaid deficiencies of Medwick. Additionally, Veerasamy teaches directly away from the invention of claim 1 because the entire goal of Veerasamy is to *prevent* the DLC from burning off by using a tungsten disulfide layer located over the DLC. Veerasamy expressly states that the DLC should not be permitted to burn off during heat treatment. Thus, Veerasamy clearly teaches directly away from the invention of claim 1 for this additional reason, and also teaches directly away from the object of Medwick which is to remove carbon. The fact that Veerasamy teaches away from the invention of claim 1 means that, as a matter of law, there is no suggestion to combine it with the other art in the manner argued by the Office Action. *See Tec Air, Inc. v. Denso Mfg. Michigan Inc.*, 192 F.3d 1353, 1360-61 (Fed. Cir. 1999) (There can be no suggestion to combine if a reference “teaches away” from its combination with another source).

Krisko is also unrelated to the invention of claim 1. There is nothing in Krisko which discloses or suggests the use of ion beam deposition for DLC to directly contact a

layer comprising silicon nitride, with gas comprising a hydrocarbon, so that the DLC can be removed for exposing at least part of a layer comprising silicon nitride.

Hindsight is impermissible. There is no suggestion or motivation in the cited art for the 3-way combination proposed in the Office Action. The closest art, namely Veerasamy, actually teaches to *prevent* the DLC from being removed, thereby teaching away from the invention of claim 1. As the Examiner will appreciate, when the art teaches away from an invention, there is by law no suggestion or motivation to combine.

Claim 13 requires “ion beam depositing a protective layer comprising diamond-like carbon (DLC) on the glass substrate directly over and contacting the coating so that the protective layer comprising DLC directly contacts the uppermost layer of the coating that comprises silicon nitride, wherein an ion source having hydrocarbon gas therein is used in said ion beam depositing of the protective layer comprising DLC; heat treating the substrate with the coating and protective layer thereon at a temperature of at least 570 degrees C so that the protective layer comprising diamond-like carbon (DLC) at least partially burns off; and following said heat treating, coupling the glass substrate with the coating thereon to another substrate in order to form the window unit.” The cited art fails to disclose or suggest these features of claim 13, for the reasons discussed above.

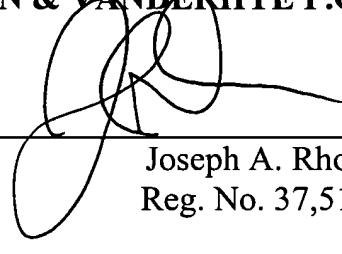
New claims 17 and 18 require that the protective layer comprising diamond-like carbon (DLC) only partially burns off during the heat treating. The cited art fails to disclose or suggest this feature of claims 17 and 18. In particular,

THOMSEN et al.
Appl. No. 10/073,266
November 28, 2005

It is respectfully requested that all rejections be withdrawn. All claims are in condition for allowance. If any minor matter remains to be resolved, the Examiner is invited to telephone the undersigned with regard to the same.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: 

Joseph A. Rhoa
Reg. No. 37,515

JAR:caj

1100 North Glebe Road, 8th Floor
Arlington, VA 22201-4714
Telephone: (703) 816-4000
Facsimile: (703) 816-4100